Arms Group Drainage System

1. Swivel Joint Type
2. Pivot Joint Type
3. Flexible Hose Type
4. Swing Master Joint Type
5. Floating Check Valve
Application:
The floating roof drainage systems have been designed by GPE to drain water from the top of external floating roof tanks without contamination by the stored product.
The system is fully articulated and allowances have been built in to cater for all possible axial, lateral, and rocking motions within the confines of the tank shell, without causing heavy loads on any part of the system.
The weight of the assembly is carried on the underside of the roof about its own center of gravity. Thereby avoiding heavy offset loads. The arrangement of pipes and swivel joints allows the lowest possible ‘collapsed’ height of the floating roof. To facilitate assembly, the entire pipe work system from sump inlet to shell nozzle outlet is in the form of flanged pipe lengths.

Features and Benefits:
Our heavy duty swivel joints are fully sealed units specifically designed for submerged service in such as articulated pipe drainage systems for floating roof tanks.
Inside the joints, there are widely spaced precision raceways each carries a full compliment of large diameter hard chrome plated balls with a reservoir between them which enables the joint to be grease packed for ‘life’. 

- Model No. 1010
- Sizes 3in through 8in
- Heavy Duty Swivel Joint
- Fully Articulated
- Easy Maintenance
- Wide Range of Materials
Application:

GPE Pivot Flexible Joint was designed to innovatively provide an easy solution to floating roof drainage problems. It combines flexibility of oil resistance composite hoses with strength of stainless steel helical reinforcement. The Pivot Flexible Joint is basically a steel pipe drain system with flexible joints that withstand an extremely wide range of service conditions. It is designed for submerged service with no lubrication required, and there are no corrosion freeze-ups. Pivot Flexible Joints are compatible with %100 aromatic products and can withstand high design pressures.

Features and Benefits:

The pivot flexible joint is designed with inner and outer stainless steel wire helixes to maintain not only hose shape but also the flexibility when subjected to internal or external pressures. The flexible joint pivot-pin design uses stainless steel bushings and spacers to eliminate binding and assure rotation. The reinforced side plates transfer the load around the flexible hose, eliminating stress on the hose end connections and minimizing the risk of hose end failure. These side plates are available carbon steel (Galvanized or Primer coated) and stainless steel materials. Pivot Flexible Joints are attached to Schedule 40 carbon steel piping to provide a rigid, maintenance-free drainage system.

Roof Drainage System

Pivot Joint Type

- Model No. 1020
- Sizes 3in through 8in
- Straight-line design
- Without O-rings, bearings
- 2 & 1 DOF Pivot Master Joint
- Easy installation
- Easy Maintenance
Roof Drainage System
Flexible Hose Type

Application:
GPE’s flexible pipe is designed for aboveground Storage tank applications such as roof drains and skimmer lines. GPE’s flexible pipe designs are compatible for continuous service, both externally and internally, in a wide range of PH solutions and chemicals.

Feature and Benefits:
- Operates in a vertical plane and does not scrape on the floor of the tank.
- Proprietary designed fittings give roof drain permanent non-leaking couplings at each end of the assembly.
- Flexible hoses dose not add pressure to the floating roof.
- Won’t cause «off-center» roof or seal gaps such as those caused by swivel joints or hard piped systems.
- Has negative buoyancy in water or heavy crude oil.

Less maintenance, less product loss, reduced shutdowns, ease of installation, maximum service life.

Specification:
- Flange class #150 ANSI B16.5 RF
- Flexible Hose:
  - Rubber Oil Resistance
  - Inner hose material: NBR resisting oil
  - Reinforcement layer: 2 layer helix steel wire 3 to 8 layers fortified fabric wave
  - Outer hose material: CR resisting oil and ultraviolet radiation
- Stainless Steel
  - Inner Flexible Hose: Stainless Steel 316
  - Outer Flexible Wire: Stainless Steel 304
Application:

GPE Swing Joints are units being supplied with swing master joint and pipe work, floats are available in either aluminum or stainless steel upon request.

The Swing Joint unit safeguards the quality of product drawn off from the tank.

Both flanges of the swing joint are cast iron raised faced flanges ANSI B16.5 Class 150. Bolt holes should be straddle bushing center lines on all sizes except 10in and 12in which are on bushing center lines.

Use the following installation procedure to prevent damage to swing joint flanges:

1. Mating pipe flanges must be parallel and aligned properly to prevent undue pipe bending stresses.
2. Class 150 Raised face flanges must use a full face gasket and be mated only with a flat face flange. Do not use a ring gasket which fits inside the bolt circle or a raised face flange as they can cause bending loads severe enough to crack the cast iron flange on the swing joint.
3. ANSI B16.1 standard for cast iron pipe flanges recommends bolting no stronger than ASTM A307 Grade B. Tapped holes in yoke require studs with UNC (Unified National Coarse) threads. Standard ANSI/API flange studs (w/8 TPI) cannot be installed in tapped holes in Swing Joints smaller or larger than 16in.
4. The swing joint should be leveled during installation to insure the swing pipe pivots in a vertical plane.
   a) Bolt the swing joint to the tank nozzle flange. Do not completely tighten the bolts. Rotate the tee flange looking up.
   b) Lugs are cast on the bottom of the yoke to center the pipe supports. Use standard pipe supports and floor flanges to carry the weight of the swing joint to the tank bottom. Do not tighten supports until swing joint is level.
   c) Place a level inside the tee long enough to rest on the inside diameter of both bushings.
   d) The clearance between the flange holes and bolts will allow a small rotational adjustment of the yoke. When a good level is obtained, cross tighten the bolts.
5. A cross-bolt tightening technique for uniform flange stress and gasket loading should be used on both swing joint flanges.
6. Routine maintenance is not required; however, each time the tank is opened the swing joint should be inspected.
Floating Check Valve

Application:
The floating check valves have been designed by GPE to avoid overflow of rain water from the roofs of external floating roof tanks, in case of blockage or shut off the drainage system or in case of any damage to drainage system to avoid roof sinking by roof blocking the product over flow over the roof.

Feature and Benefits:
GPE floating check valve is side mounted type to be installed in water sump of floating roof deck. And other type of this product is also available as bottom mounted type to be installed under water sump of floating roof deck.
• Standard Materials: Carbon Steel body with stainless steel floater ball.
• Standard Flange: Connection ANSI 150 #
• Internal & External working Pressure MAX.4.5kg/m²
## General

<table>
<thead>
<tr>
<th>Client :</th>
<th>Tank Diameter (mm) :</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No :</td>
<td>Tank Height (mm) :</td>
</tr>
<tr>
<td>Tank Quantity :</td>
<td>Tank Tag (mm) :</td>
</tr>
<tr>
<td>No Of Roof Drain Per Tank:</td>
<td>Roof Drain Size (in) :</td>
</tr>
</tbody>
</table>

## Roof Drain Nozzle & Sump Specification

<table>
<thead>
<tr>
<th>Roof Drain Sump Type :</th>
<th>TYPE A</th>
<th>TYPE B</th>
<th>TYPE C</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 (mm)</td>
<td>A2 (mm)</td>
<td>B1 (mm)</td>
<td>B2 (mm)</td>
</tr>
<tr>
<td>A3 (mm)</td>
<td>A4 (mm)</td>
<td>B3 (mm)</td>
<td>C3 (mm)</td>
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</table>

## Roof Drain Nozzle & Sump Specification

<table>
<thead>
<tr>
<th>Nozzle Orientation</th>
<th>Sump Orientation</th>
<th>Radius @R</th>
<th>Drain QTY</th>
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</thead>
<tbody>
<tr>
<td>D1 (mm) =</td>
<td>E1 (mm) =</td>
<td>R0 (mm) =</td>
<td>N0=</td>
</tr>
<tr>
<td>D2 (mm) =</td>
<td>E2 (mm) =</td>
<td>R1 (mm) =</td>
<td>N1=</td>
</tr>
<tr>
<td>β (Deg) =</td>
<td></td>
<td>R2 (mm) =</td>
<td>N2=</td>
</tr>
</tbody>
</table>

Distance From Inside Shell to Face Of Shell Outlet Nozzle Flange (mm) "F1":
Distance From Tank Bottom To Center Line Of Shell Outlet Nozzle Flange (mm) "F2":

## Roof Position

<table>
<thead>
<tr>
<th>Tank Bottom Slop (%) :</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Up □</td>
<td>Down □</td>
</tr>
</tbody>
</table>

High High Liquid Level Position (mm) "HHLL":

Low Low Liquid Level Position (mm) "LLL":